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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,204	08/26/2005	Henry Daniell	CHL-T111XC1	7677
23557 7590 03/23/2007 SALIWANCHIK LLOYD & SALIWANCHIK A PROFESSIONAL ASSOCIATION PO BOX 142950 GAINESVILLE, FL 32614-2950			EXAMINER KUBELIK, ANNE R	
			ART UNIT 1638	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE 3 MONTHS			MAIL DATE 03/23/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/520,204		DANIELL, HENRY	
	<b>Examiner</b>		<b>Art Unit</b>	
	Anne R. Kubelik		1638	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 December 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. Applicant's election of Group I in the reply filed on 11 December 2006 is acknowledged. Because applicant made no arguments and cancelled all claims to the nonelected invention, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.
3. The drawings filed 3 January 2005 are objected to because no details can be made out in Fig 1B and Fig 9, and the lettering is difficult to make out in Fig 1A.
4. The title of the invention is not descriptive of the instantly claimed invention, which is a plastid transformation vector encoding merA and merB. A new title is required that is clearly indicative of the invention to which the claims are directed. Note that titles can be up to 500 characters long.
5. The abstract is not descriptive of the instantly claimed invention, as above. A new abstract is required that is clearly indicative of the invention to which the claims are directed. The abstract of the disclosure should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

### ***Claim Objections***

6. Claims 2, 6, 14, 25, 29 and 34-35 are objected to because of the following informalities:

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In claim 2, "phytoremediation" is misspelled.

In claim 6, "3'untranslated" should be replaced with --3' untranslated--.

In claim 14, both recitations of "3'UTR" should be replaced with --3' UTR--.

There is no period at the end of claim 25.

In claim 29, lines 2 and 4, "for" should be replaced with --of--.

In claim 34, in line 1, --, said method-- should be inserted before "comprising", in line 2, there should be a comma after "cell" and in line 3, there should be an --and-- after "merB".

In claim 35, there should be a comma after "2".

7. Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Plastid genomes are not different when they are in one type of plastid than another. Thus, the claim fails to further limit claim 1.

### ***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-25 and 34-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Dependent claims are included in all rejections.

In claim 1, it is unclear if the vector being claimed is in a plant or if in the reference to a plant in lines 5-6 it should indicate the properties of the vector when it is in a plant. If the

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former, the plant should be claimed, rather than the vector, with appropriate amendments in the dependent claims. If the latter, lines 5-6 need substantial amendment.

Claim 7 is indefinite in its recitation of “said flanking sequences are conserved in the plastid genome of said plant species”. What does it mean that the flanking sequences are conserved in a plastid genome? “Conserved” as used in relation to sequences, refers to evolutionary conservation over numerous related species; a sequence cannot be conserved in one species.

Claim 13 lacks antecedent basis for the limitation “said operon”.

In claim 19, the DNA cannot encode *aadA*, as *aadA* is a gene. DNA can only encode RNA or protein.

Claim 20 lacks antecedent basis for the limitation “said at least one ...compound”.

In claims 23, it unclear if the progeny comprises the vector. Because the vector would only be inherited from the maternal parent, not all progeny would comprise it.

In claim 24, it is unclear if the seed comprises the vector.

Claim 25 lacks antecedent basis for the limitation “said at least one heterologous DNA ... compound”.

Claims 25 and 36-37, line 1, are indefinite in their recitation of “including”. It is unclear of the plastid comprises the DNA or expression cassette or if the plant cell comprises a plastid and the DNA or expression cassette.

Claim 31 lacks antecedent basis for the limitation “the *aadA* gene”.

Claim 34 is indefinite for being dependent on a non-existent claim.

Claim 34 lacks antecedent basis for the limitation “said plant cells” in line 3.

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Claim 37 is indefinite in its recitation of “an operon encoding the ... operon”. An operon encodes portions or RNAs, not operons.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claim 37 is rejected under 35 U.S.C. 102(b) as being anticipated by Daniell (WO 99/10513).

Daniell teaches plant cells comprising an expression cassette comprising the Prn plastid promoter, an operon comprising the aadA and EPSPS coding sequences, the psbA 3' terminator and flanking sequences for homologous recombination (pg 56, lines 4-12; pg 57, lines 1-20). EPSPS would phytoremediate glyphosate.

12. Claims 1-9, 11-15 and 18-37 are rejected under 35 U.S.C. 102(a) as being anticipated by Daniell et al (WO 01/64024).

Daniell et al teach a plastid transformation vector comprising a first flanking sequence (trnI), a promoter (16S Prn), a selectable marker (aadA), sequences encoding MerA and MerB arranged as an operon, a terminator (3' psbA), and a second flanking sequence (trnA) (Figs 8 and 12-13; ), tobacco, Chlorella and Synechocystis thereby transformed, as well and progeny and seeds from the tobacco plants, and a method comprising exposing the plants to mercury (Figs 9-

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11; pg 30, line 2, to pg 35, line 9). The flanking sequences would be "conserved in the plastid genome of a plant species" and are from a transcriptionally active region.

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 1-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell et al (WO 01/64024) in view of Rathinasabapathi et al (1994, Planta 193:155-162).

The claims are drawn to plastid transformation vectors encoding merA, merB and BADH.

The teachings of Daniell et al are discussed above. Daniell et al do not disclose BADH as the selectable marker.

Rathinasabapathi et al teach transformation of tobacco plants with a spinach or beet gene encoding BADH (pg 157). The protein is targeted to the chloroplasts (pg 157-158) and the resulting plants are resistant to betaine aldehyde (pg 159-160).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the plastid transformation vectors taught by Daniell et al, to use the BADH gene as a selectable marker as described in Rathinasabapathi et al. One of ordinary skill in the art would have been motivated to do so because of the suggestion of Rathinasabapathi et al to use betaine aldehyde resistance as a selectable marker in plants that lack glycine betaine (paragraph spanning the columns, pg 161) and because substitution of chloroplast transformation

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for chloroplast targeting of a nuclear-encoded gene is an obvious design choice.

15. Claims 1-16 and 18-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell (WO 99/10513) in view of Meagher et al (1999, US Patent 5,965,796).

The claims are drawn to plastid transformation vectors encoding merA and merB.

Daniell disclose plastid transformation vectors comprising a first flanking sequence (trnI), a promoter (16S Prn or PatpB), a selectable marker (aadA or hyg-R), a sequence expressing a second protein (GFP or CryIIA), a terminator (3' psbA), and a second flanking sequence (trnA) (Fig 6-8. Hyg-R is an antibiotic-free selectable marker. trnI and trnA are sequences in a spacer regions and are highly conserved in plant species (pg 20, lines 20-25). Daniell et al disclose plants transformed with the vectors and progeny and seeds of those plants (pg 42, line 10, to pg 51, line 10; pg 57, line 1, to pg 60, line 36).

Daniell et al do not disclose merA and merB in those vectors.

Meagher et al teach plants expressing both merA and merB (claims 2, 16, 18 and 26).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the plastid transformation vectors taught by Daniell, to comprise merA and merB described in Meagher et al. One of ordinary skill in the art would have been motivated to do so because expression as an operon in the plastid would allow production of stoichiometric amounts of the two enzymes in the pathway.

16. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell in view of Meagher et al as applied to claims 1-16 and 18-37 above, and further in view of Rathinasabapathi et al (1994, Planta 193:155-162).

The claims are drawn to plastid transformation vectors encoding merA and merB with BADH as the slectable marker.



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The teachings of Daniell in view of Meagher et al are discussed above. Daniell in view of Meagher et al do not disclose the use of BADH as the selectable marker.

Rathinasabapathi et al teach transformation of tobacco plants with a spinach or beet gene encoding BADH (pg 157). The protein is targeted to the chloroplasts (pg 157-158) and the resulting plants are resistant to betaine aldehyde (pg 159-160).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the plastid transformation vectors taught by Daniell in view of Meagher et al, to use the BADH gene as a selectable marker as described in Rathinasabapathi et al. One of ordinary skill in the art would have been motivated to do so because of the suggestion of Rathinasabapathi et al to use betaine aldehyde resistance as a selectable marker in plants that lack glycine betaine (paragraph spanning the columns, pg 161) and because substitution of chloroplast transformation for chloroplast targeting of a nuclear-encoded gene is an obvious design choice.

### *Conclusion*

17. No claim is allowed.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

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Anne Kubelik, Ph.D.

March 15, 2007



ANNE KUBELIK, PH.D.  
PRIMARY EXAMINER